TN5250 Terminal Emulation

User's Guide

TN5250 Terminal Emulation User's Guide

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Overview

Introduction

The *TN5250 Terminal Emulation User's Guide*, explains how to configure and use the TN5250 emulation on your terminal. This emulation is an option for terminals.

About This Guide

This guide is organized into three chapters and two appendixes:

◆ Chapter 1, "Getting Started," explains TN5250 terminal emulation connection definitions, connections, and emulator sessions.

◆ Chapter 2, "The Menu System," explains the TN5250 online menu system including keyboard mapping, and how to navigate through the menu system.

◆ Chapter 3, "Terminal Keyboard," compares TN5250 and terminal keys, and outlines the terminal's keyboard features.

◆ Appendix A, "Error Messages," lists error messages and solutions to problems reported by those error messages.

◆ Appendix B, "Troubleshooting Aids," provides a short guide for preparation in troubleshooting your terminal.

About TN5250 Terminal Emulation

TN5250 terminal emulation provides the protocol to connect a terminal to IBM midrange systems (AS/400 servers). Once connected, the user can access and use legacy applications such as database and word processing through a terminal.

Product Features

TN5250 terminal emulation includes these easy-to-use features:

◆ Interactive keyboard mapping

◆ TN5250-style screen attributes, including color and attribute settings

◆ Multiple sessions

◆ Telnet protocol

◆ Color terminal support

**The TN5250
Connection**

To operate TN5250 emulation, you must connect to an AS/400 server operating with OS/400 Version 1, release level 3.0 or higher. Additionally, you must be operating the emulator across a TCP/IP network, using an IBM 8209 or equivalent TCP/IP attachment. When you use TN5250 terminal emulation, you are communicating directly with the AS/400 server. This communication is accomplished with the IBM AS/400 system internet protocol. Figure 1 shows the TN5250 connection related to a terminal.

Figure 1   The TN5250 Connection
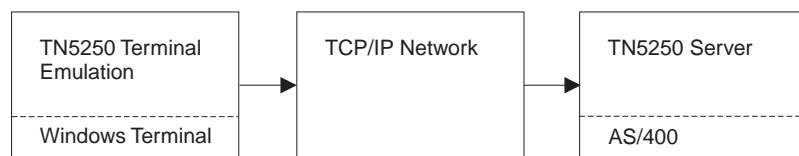
❖ **Note** TN5250 terminal emulation software is downloaded, stored, and operated on your terminal.

**Guide Format
Conventions**

This section describes the format conventions used in this guide.

Text Format

Table 1 lists the text format conventions used in this document.

Table 1   Text Format Conventions

Convention	Description
Bold	Indicates a factory default.
Italic	Indicates emphasis, a new term, or book title.
Keycaps	Indicates a key on the keyboard.
San Serif Compressed	Indicates screen display.
Monospace	Indicates user input.
Monospace Italic	Indicates user input variables.

Command and Key Sequence Format

Table 2 lists the command and key sequence formats used in this guide.

Table 2   Command and Key Sequence Format Conventions

Convention	Description
command < *xxx* >	Command format. The right and left angle brackets indicate the boundaries of the parameter list.
Alt + **x** or **Alt** + **X**	Key sequence format. To enter this type of key sequence, press the keys simultaneously in the sequence shown. The operation is performed only when the last key is pressed.
Ctrl (right)	**Ctrl** key on the right side of the keyboard in contrast to the one on the left side.

1 *Getting Started*

This chapter discusses how to initiate TN5250 terminal emulation and explains:

◆ Downloading the TN5250 terminal emulation option.

◆ Defining and using TN5250 connections.

◆ Opening and exiting sessions.

Read this chapter carefully before attempting to connect to a TN5250 server.

Downloading TN5250 Option Firmware

The downloading of the TN5250 is similar to a flash download, and is done through the serial port, the parallel port, the Remote Administration tool, or the PCMCIA card.

❖ **Note** TN5250 terminal emulation can be downloaded only to some terminals. Contact your system administrator or see the *Terminal Firmware Download Instructions* for options available for your terminal.

TN5250 Server Connection Definitions

When your terminal is first turned on, the Connections dialog box displays. In this dialog box you will see the Connections list box. It is a list of preexisting connections. You can use one of these preexisting connections to connect to and start TN5250 emulation, or you can define a new TN5250 connection.

❖ **Note** See your terminal's connectivity guide for more information about connection definitions and the Connections dialog box.

Preexisting Connection Definitions

To use a preexisting connection definition:

1 Click on an appropriate connection name in the Connections list box (see Figure 1-1).

2 Click on the Connect command button.

You will connect to the host you specified in the connection definition selected. Connection definitions appearing in the Connections list can be edited. To edit:

1 Select the connection that you want to edit from the Connections list.

2 Click on the Setup command button in the Connections dialog box.

3 Click on the Properties command button in Connection Setup dialog box.

The Connection Properties dialog box displays. Use this dialog box to edit your preexisting connection definition.

New Connection Definitions

If the connection definition you want does not already exist in the Connections list, you can create one by:

1 Click on the Setup command button in the Connections dialog box.

2 Click on the New command button in the Connection Setup dialog box.

3 Click on the Terminal Emulation radio button, then the OK command button in the New Connection dialog box.

❖ **Note** See your terminal's connectivity guide for more information about instructions 1 through 3 above. Refer to Figure 1-1, the Connection Properties dialog box, while executing instructions 4 through 8.

Figure 1-1   Connection Properties Dialog Box
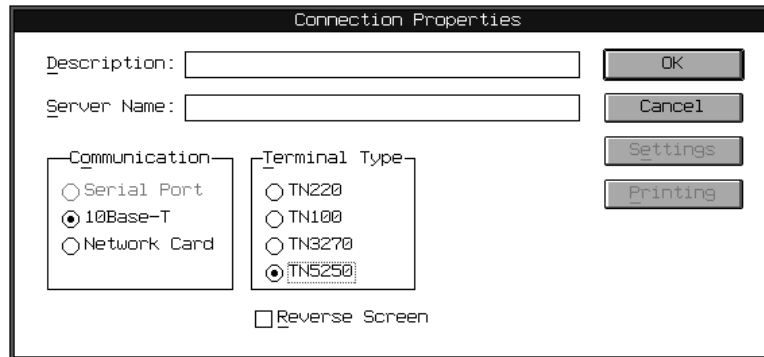
4 Click on the TN5250 radio button in the Terminal Type group box.

5 Enter a connection description (a name you choose) in the Description entry field.

6 Enter a server name and any command options (see Table 1-1, TN5250 Command Options), in the Server Name entry field.

❖ **Note** The `port` command option (for example `5250`) should be included in the server name entry.

❖ **Note** If the TN5250 terminal type is grayed out, check with your Administrator to see if the TN5250 application firmware has been downloaded to your terminal.

7 If you wish to activate the reverse video display, click the Reverse Screen button. This effects reverse video in all the subsequent displays of the session.Click on the OK command button.

8 Click on the Close command button in the Connection Setup dialog box.

After you click on the Close command button, a dialog box appears displaying the message:

Flash Write In Progress, Do Not Power Down Unit

This message indicates that your new connection definition is being stored in the terminal's memory.

When the flash write is finished, the new connection appears in the Connections list in the Connections dialog box. To connect, highlight the connection, then click on the Connect command button in the Connections dialog box. A message displays:

Trying to connect to XXX.XXX.XX.XX.

Connected to XXX.XXX.XX.XX.

TN5250 Command Options

Table 1-1 lists the command options that can be included in the Server Name field.

Table 1-1   TN5250 Command Options

Option	Description
`-escape` *<character>*	Sets the escape character for escaping from a session. Specify *character* as: ◆ A single character. ◆ A key combination.
`hostname`	Lets you specify a host name for immediately displaying a session. The host name is the name of your AS/400 host.

Table 1-1   TN5250 Command Options, Continued

Option	Description
-terminal <*terminal type*>	Specifies the type of terminal format for the data you receive from the host. Specify terminal type as: ◆ IBM 3179-2 ◆ IBM 5251-11 ◆ IBM 3196-A1 ◆ PC-XT ◆ NVT This option overrides terminal negotiations.
-port <#>	Specifies the host port you want to use.
-?	Displays the command option summary.
-version	Displays the version number and environment variable settings.

❖ **Note** The default command options are:
   ◆ Host Name: OCS_Gateway.
   ◆ Port Number: 23.

❖ **Note** Pressing **F4** when the cursor is positioned next to any field listed in Table 1-1 displays a list of choices for that function.

Sessions

If you connect to a TN5250 server using a definition that contains an IP address, the emulator will open up an initial TN5250 session (emulator-opened session) using that IP address. That session will be placed in the Sessions list in the Sessions menu, as the initial open session (see Chapter 2, "The Menu System," for more information).

If you try to connect to a server using a definition that does not contain an IP address, you will not connect. Instead, the emulator will display the TN5250 menu system, allowing you to create a session (user-opened session). Once a session is created, you can then connect and run your session.

A session must be opened to use TN5250 terminal emulation. This section discusses both emulator-opened sessions and user-opened sessions.

Emulator-Opened Sessions

If you have specified an IP address in your connection definition, then once connected the Pass Through Screen displays (see Figure 1-2).

Figure 1-2   Pass Through Screen

```
┌──────────────────────────────────────────────────────────┐
│                    Pass Through Screen                     │
│  Type choices, Press Enter.                                │
│                                                            │
│              Remote location name           AS400A         │
│                                                            │
│              Mode name                      LU62APPC       │
│                                                            │
│              Virtual controller             QPACTL00       │
│                                                            │
│              Virtual display device         _____     │
│                                                            │
│              Remote network identifier      _____     │
│                                                            │
│              Local PU name                  MKPTU3         │
│                                                            │
│              Local LU name                  _____     │
│                                                            │
└──────────────────────────────────────────────────────────┘
```

An initial session has been opened by the emulator. From the Pass Through Screen, press **Ctrl** (right) to go to the first open session. To open subsequent sessions, press **Alt + ?**. The main menu will display. Use the Sessions menu to open more sessions.

User-Opened Sessions

If you have not specified an IP address in your connection definition, then Main Menu - TN5250 displays (the main menu of the TN5250 user interface). Use this menu to open your initial session. You will need to open a session to continue.

❖ **Note** See Chapter 2, "The Menu System," for further instructions about navigating through the TN5250 terminal emulation menu system.

To open a session:

1   Position the cursor at Open Session.

2   Press **Ctrl**.

3 In the Open Session menu with the **Tab** key select:

  a Session: Enter a name for your session.

  b Host Name: (skipping Auto Start)   Enter the address of the server.

  c Port Number: Specify 23 or other appropriate number.

4 Skip IBM Terminal Type, and press **Ctrl**.

Your initial session will be opened.

❖ **Note** The maximum number of simultaneous open sessions is three.

Ending a Session   You can end a session in one of two ways:

1 Press **Alt** + **x**, while a session is displayed:

  a Terminal emulation ends.

  b The terminal user interface displays.

  If other sessions are active, the Open Session menu displays. You can end all open sessions by repeating the steps in 1 for each session, or resume a previous session. The terminal user interface will display only after all active sessions are ended.

2 Use Main Menu - TN5250:

  a Press **Alt** + **?**, displaying Main Menu - TN5250.

  b Position the cursor at Exit TN5250.

  c Press **Ctrl**.

  The terminal user interface displays. See Chapter 2, "The Menu System," for more information about ending TN5250 sessions.

2 *The Menu System*

The TN5250 menu system is used to:

◆ Control sessions

◆ Invoke utility functions

◆ Map keyboards

Additionally, the TN5250 menu system includes a help section. The help section is discussed in Help Menu at the end of this chapter, and presents additional information about emulator menus and functions.

Main Menu

Figure 2-1 shows the TN5250 Main Menu that displays after connecting with an emulator-opened session. From this menu, you can access any TN5250 function.

In the Main Menu TN5250 displays the top-level menus of the system:

◆ Sessions/Open Sessions

◆ About TN5250

◆ Utilities

◆ Screen Attributes

◆ Keyboard Mapping

◆ Exit TN5250

These menus, except Exit TN5250, are discussed in the following sections. Exit TN5250 is an exit function only, and is discussed in "Ending a Session" in Chapter 1.

Figure 2-2 shows the TN5250 main menu that displays after trying to connect with a connection definition that does not contain an IP address (user-opened session). From this menu, you must open a session to continue.

Figure 2-1   Main Menu - Emulator-Opened Sessions

```
┌─────────────────────────────────────────────┐
│┌───────────────────────────────────────────┐│
││          Main Menu - TN5250                ││
││ ──────────────────────────────────────────││
││                                            ││
││ Sessions                              >>   ││
││ About TN5250                          >>   ││
││ Utilities                             >>   ││
││ Screen Attributes                     >>   ││
││ Keyboard Mapping                      >>   ││
││ Exit TN5250                           >>   ││
││                                            ││
││                                            ││
││ Right Ctrl:Current Selection               ││
││  Tab:Next Field           F1:Help          ││
││    F3:Exit Menu                            ││
││                                            ││
│└───────────────────────────────────────────┘│
└─────────────────────────────────────────────┘
```
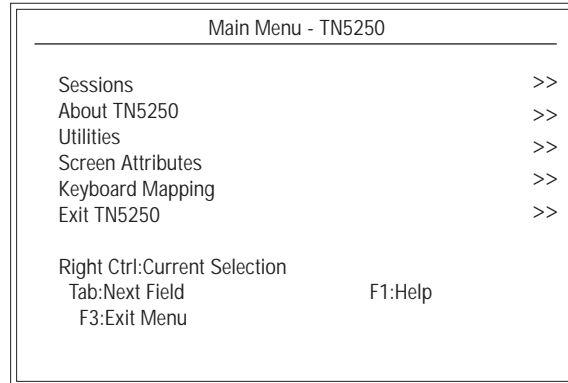
Figure 2-2   Main Menu - User-Opened Sessions

```
┌─────────────────────────────────────────────┐
│┌───────────────────────────────────────────┐│
││          Main Menu - TN5250                ││
││ ──────────────────────────────────────────││
││                                            ││
││ Open Session                          >>   ││
││ About TN5250                          >>   ││
││ Utilities                             >>   ││
││ Screen Attributes                     >>   ││
││ Keyboard Mapping                      >>   ││
││ Exit TN5250                           >>   ││
││                                            ││
││                                            ││
││ Right Ctrl:Current Selection               ││
││  Tab:Next Field           F1:Help          ││
││    F3:Exit Menu                            ││
││                                            ││
│└───────────────────────────────────────────┘│
└─────────────────────────────────────────────┘
```
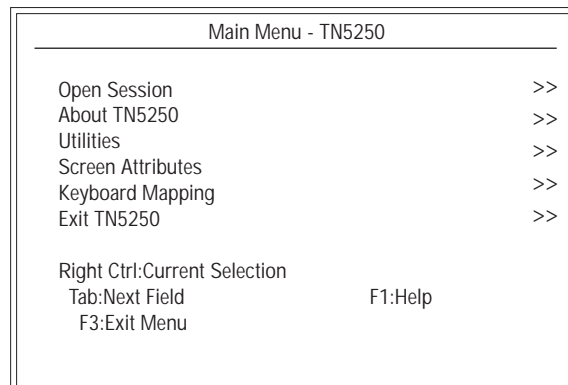
Menu Control Keys   Menus are invoked by positioning the cursor next to a menu selection, then pressing the **Ctrl** key. Menu functions are selected by using a combination of control keys and alphanumeric keys (key sequences). The control keys used are **Ctrl** and **Alt**. See Table 1 "Text Format Conventions" in the Overview.

The keys that appear at the bottom of each menu allow you to navigate through the menus. These are menu control keys, and are described in Table 2-1.

Table 2-1   Menu Control Keys

Key	Description
F1	Invokes the help system.
F2	Edits a key.
F3	Exits to the menu.
F4	Displays a list of current information.
F5	Refreshes the connection information.
F6	Saves a connection definition.
F12	Returns to the previously viewed menu.
Page Up	Moves to the previous page.
Page Down	Moves to the next page.
Tab	Moves the cursor to the next field.
Ctrl (right)	Selects the current selection or the next menu.

Sessions Menu

Depending on the way you configure your connection, one of two sessions' menus displays:

◆ If you connect to a server using an IP address, the emulator will open with a session. Once you return to the main menu, the first choice on the main menu will be Sessions. Use this method to connect with preexisting connection definitions.

◆ If you connect to a server without using an IP address (simply typing 5250 in the Description field of the Connection Properties dialog box), a session will not be opened, but the main menu will display. In this menu the first choice will be Open Session. Use this menu to open your initial session. Use this method to create new connection definitions.

Invoke the Sessions menu by:

1 Position the cursor next to Sessions.

2 Press **Ctrl** (right). The Sessions menu displays.

Figure 2-3 shows the Sessions menu. The menu displays a list of preexisting connection definitions.

Figure 2-3   Sessions Menu

```
┌────────────────────────────────────────────────────────────────┐
│                            Sessions                              │
│  ─────────────────────────────────────────────────────────────  │
│  1=Create      2=Copy      3=Switch     4=Display   5=Close    6=Options │
│                                                                  │
│     Session Names       Host Names            Server IP Address  Operating Mode │
│     ─────────────────────────────────                           │
│                                                                  │
│                                                                  │
│                                                                  │
│                                                                  │
│                                                                  │
│         Right Ctrl:Current Selection                Tab:Next Field │
│              F1:Help                                 F3:Exit Menu │
│              F4:List                                             │
└────────────────────────────────────────────────────────────────┘
```

The functions displayed in this menu are numbered 1 through 6. To use:

1 Position the cursor to the left of the appropriate data field, and enter the appropriate number.

2 Perform the required action (see Table 2-2 for more details).

3 Press **F3** to exit the menu.

Table 2-2 describes the functions in the Sessions menu.

Table 2-2   Sessions Menu Functions

Function	Description
1=Create	Use this function to create a new session. New sessions are created in the Open Session menu (refer to Open Session). Once the data is entered in the Open Session menu, press **F3**. A new session will display in the Sessions menu.
2=Copy	Copy duplicates a session. Press **Ctrl** (right). The emulator will create and connect to a new session, using the parameters of the chosen session. The number of the new session is an increment of one.
3=Switch	This function switches from one session to another session. Press **Ctrl** (right) to switch to the selected session.
4=Display	Display lists the status of a session. Press **Ctrl** (right). The Session Status menu appears, listing the status of the selected session.
5=Close	This function deletes a session from the Session Names list. Press **Ctrl** (right) to delete sessions. More than one session can be deleted, by entering 5 next to each session to be deleted.
6=Options	The Options function displays a list of Telnet responses. They are: ◆ Are You There? ◆ Abort Output ◆ Interrupt Process Enter x before each order that you want to use, then press **Ctrl** (right)

Open Session Menu

This menu displays only in a user-opened session. It is used for creating new sessions. You invoke the Open Session menu by:

1 Position the cursor next to Open Session in the main menu.

2 Press **Ctrl** (right)

Figure 2-4 shows the Open Session menu.

Figure 2-4   Open Session Menu

```
┌────────────────────────────────────────────────────────────┐
│  ┌───────────────────────────────────────────────────────┐ │
│  │                     Open Session                      │ │
│  │  ───────────────────────────    ──────────────────    │ │
│  │                                                       │ │
│  │   *Session      _____     │ │
│  │   Auto Start    no____                                 │ │
│  │                                          [Default Values] │ │
│  │   *Host Name  *DFLT_____  OCS_Gateway    │ │
│  │   Port Number              *DFLT       23             │ │
│  │   *IBM Terminal Type       *CALC_____  IBM-5251-11 │ │
│  │                                                       │ │
│  │                                                       │ │
│  │     Right Ctrl:Current Selection          Tab:Next Field │ │
│  │         F1:Help          F3:Exit Menu     F4:List     │ │
│  │         F5:Refresh       F6:Save          F12:Prev Menu │ │
│  │                                                       │ │
│  └───────────────────────────────────────────────────────┘ │
└────────────────────────────────────────────────────────────┘
```

The parameters displayed in this menu appear as data entry fields. To use these fields:

1 Position the cursor to the left of each field in the menu, and enter the appropriate data.

2 Press **F6** to save your data and exit the menu.

Table 2-3 describes the data fields in the Open Session menu.

Table 2-3   Open Session Menu Functions

Field	Description
Session	Type the name of your session in this field.
Auto Start	Type a yes or a no in this field. Yes prompts the emulator to start the session immediately after exiting this menu.
Host Name	Enter the name of the host to which you want to connect.
Port Number	In this field, type the number of the port to which you want to connect. The recommended entry for TN5250 is 23.
IBM Terminal Type	Enter the type of terminal to which you are connecting.

The Menu System2-7

❖ **Note** For the Session, Auto Start, Host Name, and IBM Terminal Type data fields, user-selectable lists are available. To invoke a list, position the cursor at the appropriate field, then press **F4**.

About TN5250 Menu

The About TN5250 menu displays the release information for your terminal emulator software. Invoke this menu by:

1 Position the cursor next to About TN5250 in the Main menu.

2 Press **Ctrl** (right).

Figure 2-5 shows the About TN5250 menu.

Figure 2-5   About TN5250 Menu

```
────────────────────────────────────────────────────────────
                        About TN5250
──────────────────────                    ────────────────────



                  Windows Terminal Version 1.2
          Copyright © 1986, 92 OpenConnect Systems, Inc.
              Copyright © 1997 Wyse Technology, Inc.




                        F3:Exit Menu

────────────────────────────────────────────────────────────
```
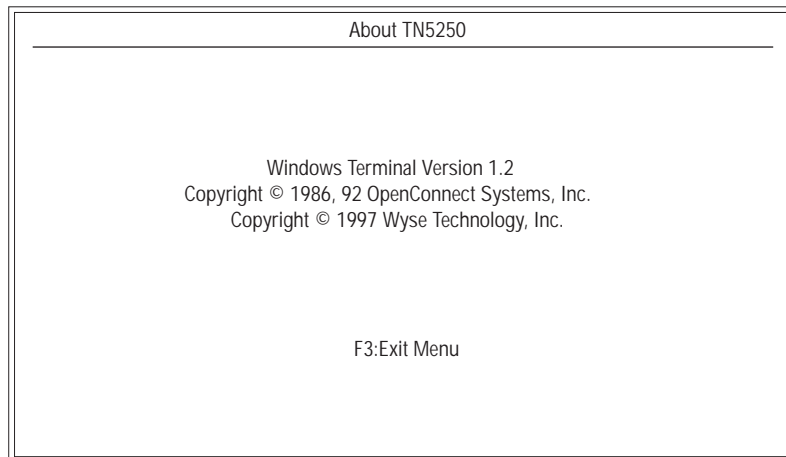
Utilities Menu

The Utilities menu displays the Set Local Parameters function. Invoke this menu by:

1   Position the cursor next to Utilities in the Main menu.

2   Press **Ctrl** (right).

Figure 2-6 shows the Utilities menu.

Figure 2-6   Utilities Menu

```
┌─────────────────────────────────────────────────────┐
│ ┌───────────────────────────────────────────────┐   │
│ │                    Utilities                    │   │
│ │ ───────────────────────────────────────────── │   │
│ │                                                 │   │
│ │   Set Local Parameters                    >>    │   │
│ │                                                 │   │
│ │                                                 │   │
│ │                                                 │   │
│ │                                                 │   │
│ │                                                 │   │
│ │   Right Ctrl:Current Selection    F1:Help       │   │
│ │      F3:Exit Menu             F12:Prev Menu     │   │
│ │                                                 │   │
│ └───────────────────────────────────────────────┘   │
└─────────────────────────────────────────────────────┘
```
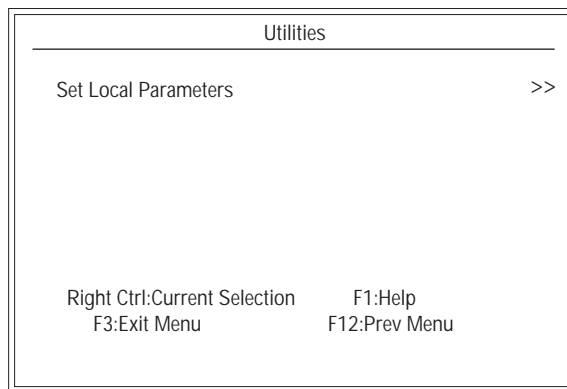
Set Local Parameters lets you control some additional local terminal features. Table 2-4 describes the functions of the Set Local Parameters menu.

Table 2-4   Set Local Parameters Functions

Function	Key Sequence	Description
Echo Char	**Ctrl + E**	Echoes a character. This function sets the local echoing (local display) of characters that you enter at the keyboard. You can set the emulator to either display or not display entered characters.
Session Escape	**Ctrl +]**	Escapes a session. This function lets you escape from your current session. When invoked, the main menu displays. Your session continues running in the background. See Open Session in this chapter for further information about sessions.
Session Toggle	**Ctrl + T**	Toggles between sessions. This function lets you toggle sessions.

Remapping Local Parameter Keys

The key sequences listed in Table 2-4 can be remapped by:

1 Position the cursor at the key sequence you want to remap.

2 Press the **F4** key to display the available key sequences.

3 Position the cursor at the key sequence you want, and press **Ctrl** (right). The Set Local Parameters menu reappears, displaying the new key sequence for that parameter.

Screen Attributes Menu

The terminal emulator will display IBM TN5250-style screen attributes, depending on the local terminal type setting and application that you are using. The Screen Attributes menu displays these TN5250-style attributes. Invoke the menu by:

1 Position the cursor next to Screen Attributes in the Main menu.

2 Press **Ctrl** (right).
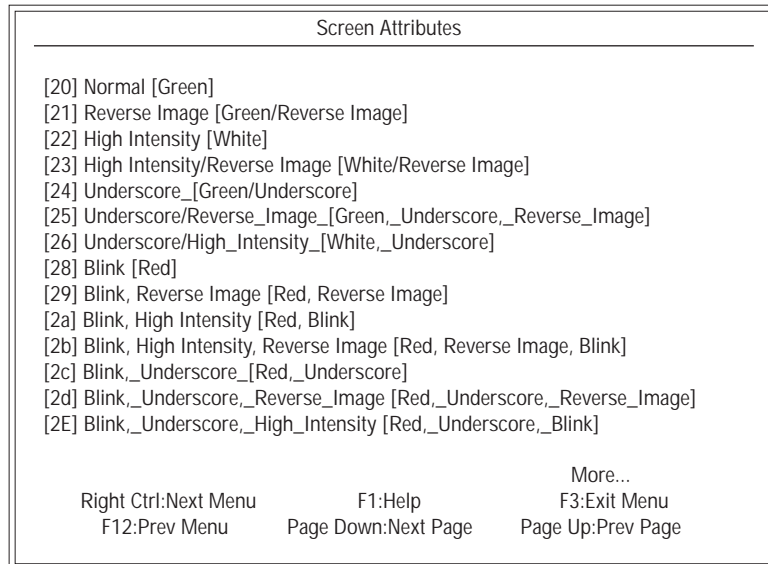
Figure 2-7 shows the Screen Attributes menu.

Figure 2-7   Screen Attributes Menu

```
┌────────────────────────────────────────────────────────────────┐
│                        Screen Attributes                        │
│  ────────────────────────────────────────────────────────────  │
│                                                                  │
│   [20] Normal [Green]                                            │
│   [21] Reverse Image [Green/Reverse Image]                       │
│   [22] High Intensity [White]                                    │
│   [23] High Intensity/Reverse Image [White/Reverse Image]        │
│   [24] Underscore_[Green/Underscore]                             │
│   [25] Underscore/Reverse_Image_[Green,_Underscore,_Reverse_Image]│
│   [26] Underscore/High_Intensity_[White,_Underscore]             │
│   [28] Blink [Red]                                               │
│   [29] Blink, Reverse Image [Red, Reverse Image]                 │
│   [2a] Blink, High Intensity [Red, Blink]                        │
│   [2b] Blink, High Intensity, Reverse Image [Red, Reverse Image, Blink]│
│   [2c] Blink,_Underscore_[Red,_Underscore]                       │
│   [2d] Blink,_Underscore,_Reverse_Image [Red,_Underscore,_Reverse_Image]│
│   [2E] Blink,_Underscore,_High_Intensity [Red,_Underscore,_Blink]│
│                                                                  │
│                                                     More...      │
│      Right Ctrl:Next Menu        F1:Help            F3:Exit Menu │
│         F12:Prev Menu       Page Down:Next Page  Page Up:Prev Page│
└────────────────────────────────────────────────────────────────┘
```

Each displayed screen attribute includes the associated IBM 5250 attribute code and text description. The following is an example:

[20] Normal [Green]

where [20] is the IBM 5250 attribute code, and Normal [Green] is normal green text.

❖ **Note** The menu displayed in Figure 2-7 is one of two menus. As shown, pressing the **Ctrl** (right) key takes you to the second attribute menu.

Keyboard Mapping Menu

You can view your emulator's current key mappings (sequences) by accessing the Keyboard Mapping menu. Invoke this menu by:

1 Position the cursor next to Keyboard Mapping in the Main menu.

2 Press **Ctrl** (right).

Figure 2-8 shows the Keyboard Mapping menu.
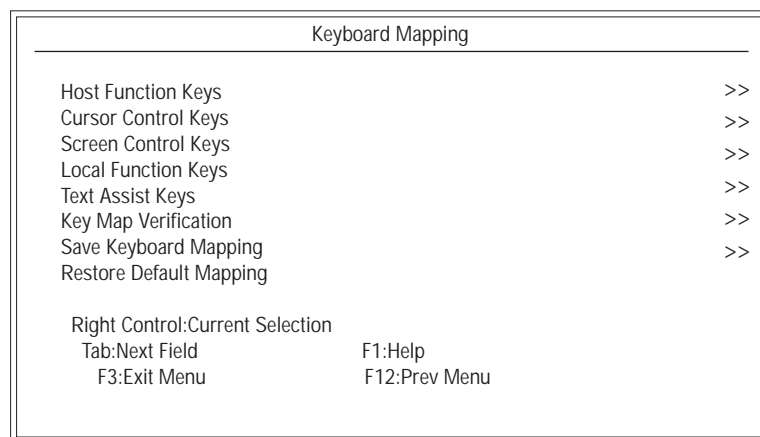
Figure 2-8   Keyboard Mapping Menu

```
┌──────────────────────────────────────────────────────────────┐
│                        Keyboard Mapping                        │
│  ───────────────────────────────────────────────────────────  │
│                                                                │
│      Host Function Keys                                    >>  │
│      Cursor Control Keys                                   >>  │
│      Screen Control Keys                                   >>  │
│      Local Function Keys                                       │
│      Text Assist Keys                                      >>  │
│      Key Map Verification                                  >>  │
│      Save Keyboard Mapping                                 >>  │
│      Restore Default Mapping                                   │
│                                                                │
│       Right Control:Current Selection                          │
│        Tab:Next Field              F1:Help                      │
│          F3:Exit Menu             F12:Prev Menu                 │
│                                                                │
└──────────────────────────────────────────────────────────────┘
```

Table 2-5 describes the functions of the Keyboard Mapping menu.

Table 2-5   Keyboard Mapping Functions

Function	Description
Host Function Keys	Lists the host system control keys.
Cursor Control Keys	Lists the keys that control cursor movement.
Screen Control Keys	Lists the keys that control the terminal screen.
Local Function Keys	Lists the local session control keys.
Text Assist Keys	Lists the keys that control text.
Key Map Verification	Verifies terminal emulator keys. When invoked, the 5250 Key Verification menu appears. Enter a key: ◆ If you entered an alpha numeric key, its mapping will appear following 5250 EBCDIC Key. ◆ If you entered a control key, its mapping will appear beneath 5250 Key. The key sequence you entered will display under Key Cap.
Save Keyboard Mapping	Saves the current key mappings.
Restore Default Mapping	Restores the default key mappings.

Edit Keys Menu

Keys can be edited or changed by using the **F2** key, entered in the Keyboard Mapping menu. Position the cursor next to the key you want to edit, in any of the key mapping menus, and press **F2**. This key invokes the Edit Keys menu. With this menu, you can change or remap any of the emulator keys displayed in the Keyboard Mapping menu. Figure 2-9 shows the Edit Keys menu.

Figure 2-9   Edit Keys Menu

```
                              Edit Keys
    _____

     5250 Key:      Backward Tab


     Key Sequence:  _____
        Description: _____


     Key Sequence:  _____
        Description: _____


     Key Sequence:  _____
        Description: _____


     Key Sequence:  _____
        Description: _____


     Right Ctrl:Current Selection
        Tab:Next Field          F1:Help          F2:Auto Key Entry
        F3:Exit Menu          F12:Prev Menu
```

To edit a key:

1   When you select a key in the Keyboard Mapping menu for editing and press the **F2** key as explained in "Edit Keys Menu", the default octal value of the key and its description are displayed in the Edit Keys menu.

2   You can then overwrite the value and description to remap the key.
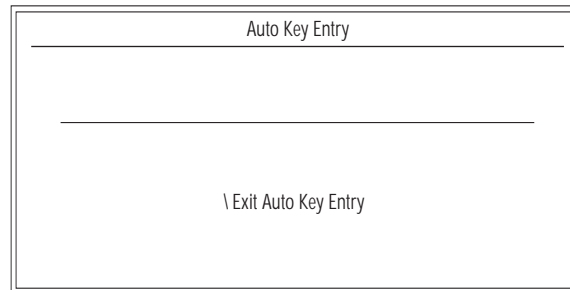
3   Press **Ctrl** (right).

The new key value and description are displayed.

❖   **Note**   Up to four key sequences can be remapped at once.

Auto Key Entry	Key sequences can be entered automatically. To do this, enter the Auto Key

Auto Key Entry Menu

Key sequences can be entered automatically. To do this, enter the Auto Key Entry mode by pressing **F2** in the Edit Keys menu. The Auto Key Entry menu appears. Figure 2-10 shows the Auto Key Entry menu.

Figure 2-10   Auto Key Entry Menu

```
┌─────────────────────────────────────────────────────┐
│  ┌───────────────────────────────────────────────┐  │
│  │                 Auto Key Entry                  │  │
│  │  ─────────────────────────────────────────────  │  │
│  │                                                 │  │
│  │      ─────────────────────────────────────      │  │
│  │                                                 │  │
│  │              \ Exit Auto Key Entry              │  │
│  │                                                 │  │
│  └───────────────────────────────────────────────┘  │
└─────────────────────────────────────────────────────┘
```

To use this menu:

1   Position the cursor next to the key you want to remap.

2   Press **F2**.

3   Type in your change.

4   Press the **** key.

5   Select Save, then press **Ctrl** (right).

The Edit Keys menu now displays the new key mapping. The Auto Key Entry function is helpful if you are mapping keys such as **F1**. TN5250 automatically enters the appropriate octal values for the mapped keys.

❖   **Note** If the Edit Key Conflict menu appears, see "Edit Key Conflict Menu" in the next section.

New keyboard mappings are saved by selecting Save in the Edit Key Response menu. From this menu, you can also:
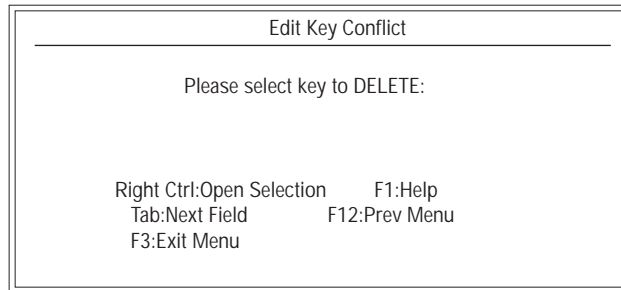
◆   Cancel

◆   Add

❖   **Note** If you want to use the default values, use Restore Default Mapping, in the Keyboard Mapping menu.

Edit Key Conflict Menu

If you attempt to map two functions to the same key, the Edit Key Conflict menu appears. See Figure 2-11.

Figure 2-11   Edit Key Conflict Menu

```
┌──────────────────────────────────────────────────┐
│  ┌────────────────────────────────────────────┐  │
│  │              Edit Key Conflict              │  │
│  │  ──────────────────────────────────────    │  │
│  │           Please select key to DELETE:      │  │
│  │                                             │  │
│  │                                             │  │
│  │                                             │  │
│  │     Right Ctrl:Open Selection      F1:Help  │  │
│  │        Tab:Next Field        F12:Prev Menu  │  │
│  │        F3:Exit Menu                         │  │
│  │                                             │  │
│  └────────────────────────────────────────────┘  │
└──────────────────────────────────────────────────┘
```

The Edit Key Conflict menu displays both the key function that you are attempting to map, and the key that is currently mapped to the key sequence. To resolve conflicts:

1   Select the key that you want to delete.

2   Press **Ctrl** (right); the Edit Keys menu reappears.

3   Select a different key.

◆   **Caution**   Primary key mappings should not be altered or deleted. This may cause unstable terminal operation.

Help Menu   The Help menu can be invoked from all top level and secondary menus by
                               pressing **F1**. Figure 2-12 shows the Main Menu - TN5250 - Help menu.

Figure 2-12   Main Menu - TN5250 - Help

```
┌─────────────────────────────────────────────────────────────┐
│                                                               │
│   ──────────────── Main Menu - TN5250 - Help ─────────────    │
│                                                               │
│     The Main Menu lists commands for operating and navigating │
│     in TN5250. Operating commands are displayed near the top of│
│     the window. The operating commands allow you to perform   │
│     tasks, such as opening sessions, mapping your keyboard, or │
│     exiting the terminal emulator:                            │
│                                                               │
│   Open Sessions                                               │
│     Select this option to open a session. Specify a host name,│
│     port number, IBM terminal type, and a server.             │
│   About TN5250                                                │
│     Select this option to view information about TN5250 and    │
│     command usage.                                            │
│                                                               │
│                                                      More...   │
│                                                               │
│     Page Down:Next Page              Page Up:Prev Page         │
│           F3:Exit Menu                     F12:Prev Menu       │
│                                                               │
└─────────────────────────────────────────────────────────────┘
```

❖ **Note** The menu displayed in Figure 2-12 is the first page of Help. Three
             more pages follow, and are accessed by the **Page Down** key.

3 *Terminal Keyboard*

The TN5250 emulation automatically remaps the terminal keyboard to the IBM 5250 terminal functionality. "Terminal Keyboard" discusses:

◆ The differences between the IBM 5250 keyboard and your terminal's keyboard.

◆ Terminal keyboard features.

Keyboard Layouts

This section compares the layout of the IBM 5250 keyboard with your terminal's keyboard.

5250 Keyboard

Figure 3-1 shows the IBM-style 5250 keyboard layout.

Figure 3-1   IBM-Style 5250 Keyboard Layout
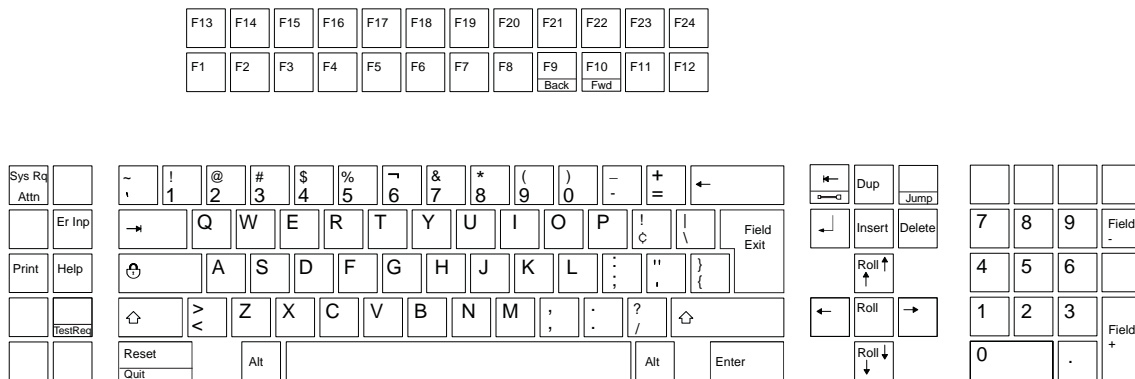
Terminal Keyboard   Figure 3-2 shows the terminal keyboard layout.

Figure 3-2   Terminal Keyboard Layout
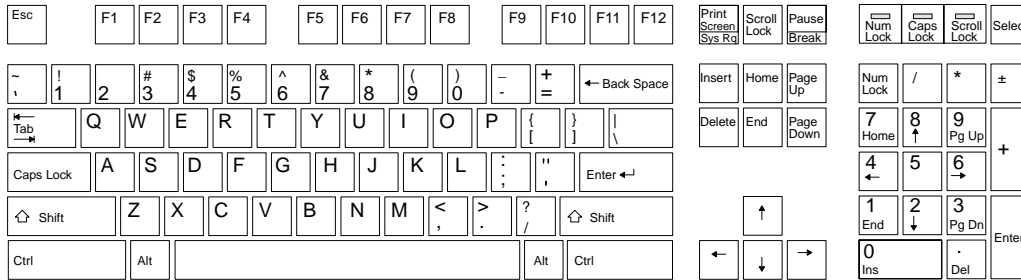
Keys   The following section compares the TN5250 key definitions with the terminal key definitions.

TN5250 Key   The IBM 5250 keyboard key definitions (refer to Figure 3-1) are listed in
Definitions   Table 3-1. The purpose of this table is to enable you to compare your old
                                 terminal's keyboard with your new terminal's keyboard. Where applicable, the
                                 TN5250 keys are presented as they are on the keyboard. Otherwise, only the
                                 key definitions are given. These might not be identical with your keyboard.

Table 3-1   TN5250 Keys

TN5250 Key	Function
Atten	Alerts the host that a requested function is not being honored.
Clear	Clears the terminal display.
Cmd1 through **Cmd24**	The **Cmd1** through **Cmd24** function keys.
↓	Moves the cursor down.
←	Moves the cursor to the left.
↑	Moves the cursor up.
→	Moves the cursor to the right.

Table 3-1   TN5250 Keys, Continued

TN5250 Key	Function
Delete	Deletes a character where the cursor is positioned.
Double Speed Left	Moves cursor four positions to the left.
Double Speed Right	Moves cursor four positions to the right.
Dup	Duplicates the last field.
Enter	Executes commands, or accepts data and/or selected options currently on the screen.
Er Inp	Clears all modified fields. The cursor moves to the insert cursor address specified in the previous display command.
Reset	Restores the original data and resets the terminal.
Field +	Moves the cursor to the start of the next field.
Field -	Moves the cursor to a previous field.
Field Exit	Deletes any characters at the cursor and to the right of the cursor, then moves the cursor to the next field.
Help	◆ If this key is used in a no error state, the help information displayed is about the currently executing software. ◆ If this key is used in an error state, the help information that is displayed is about that error.
Home	Moves the cursor to the address specified by the insert cursor address.
Insert	Sets the insert state for the field in which the operator is located.
New Line	Moves the cursor to the beginning of the next line.
Roll ↑ or **Roll** ↓	Pages up one page. Pages down one page.

Table 3-1 TN5250 Keys, Continued	
TN5250 Key	**Function**
Sys Req	Allows the display to enter the system request state.
Test Req	Gives you access to the terminal's set-up and diagnostic routines.

❖ **Note** For a more detailed description about IBM 5250 keys, refer to the *IBM 5250 Information Display System Functions Reference Manual.*

Host Function Keys   Table 3-2 lists the host function keys and your terminal's equivalent key or key sequence. See "Keyboard Mapping" in the TN5250 main menu (discussed in Chapter 2) for further information.

Table 3-2 Host Function Keys		
TN5250 Key	**Terminal Key(s)**	**Alternate Terminal Key(s)**
Atten	**Esc**	none
Enter/Rec Adv	**Ctrl** (right) Keypad **Enter**	(keypad) **Enter**
Error Reset	**Ctrl** (left)	none
Field +	Keypad **+**	none
Field -	Keypad **-**	none
Cmd1	**F1**	none
Cmd2	**F2**	none
Cmd3	**F3**	none
Cmd4	**F4**	none
Cmd5	**F5**	none
Cmd6	**F6**	none
Cmd7	**F7**	none

Table 3-2   Host Function Keys, Continued

TN5250 Key	Terminal Key(s)	Alternate Terminal Key(s)
Cmd8	F8	none
Cmd9	F9	none
Cmd10	F10	none
Cmd11	F11	none
Cmd12	F12	none
Cmd13	(shift) F1	none
Cmd14	(shift) F2	none
Cmd15	(shift) F3	none
Cmd16	(shift) F4	none
Cmd17	(shift) F5	none
Cmd18	(shift) F6	none
Cmd19	(shift) F7	none
Cmd20	(shift) F8	none
Cmd21	(shift) F9	none
Cmd22	(shift) F10	none
Cmd23	(shift) F11	none
Cmd24	(shift) F12	none
Help	Scroll Lock	none
Sys Req	Alt Prtsc	none
Tst Req	Alt Pause	none

Cursor Control Keys   Table 3-3 lists the TN5250 cursor control keys and your terminal's equivalent cursor control key or key sequence. See "Keyboard Mapping" in the TN5250 main menu (discussed in Chapter 2) for further information.

Table 3-3   Cursor Control Keys

TN5250 Key	Terminal Key(s)	Alternate Terminal Key(s)
Back Space	**Back Space**	none
Double Speed R**t**	**Alt →**	none
Double Speed Lt	**Alt ←**	none
↓	↓	(keypad) ↓
Field Exit	**Enter**	none
Home	**Home**	(keypad) **Home**
←	←	(keypad) ←
→	→	(keypad) →
↑	↑	(keypad) ↑

Screen Control Keys   Table 3-4 lists the TN5250 screen control keys and your terminal's equivalent key or key sequence. See "Keyboard Mapping" in the TN5250 main menu (discussed in Chapter 2) for further information.

Table 3-4   Screen Control Keys

TN5250 Key	Terminal Key(s)	Alternate Terminal Key(s)
Backward Tab	**Shift Tab**	none
Clear	**Pause**	none
Delete	**Delete**	(keypad) **Del**
Dup	(pad) **1**	none
Erase Input	**Alt End**	none

Table 3-4   Screen Control Keys, Continued

TN5250 Key	Terminal Key(s)	Alternate Terminal Key(s)
Forward Tab	**Tab**	none
Insert	**Insert**	(keypad) **Ins**
Roll Down	**Pg Up**	(keypad) **PgUp**
Roll Up	**Pg Dn**	(keypad) **PgDn**

Local Function Keys   Table 3-5 lists the IBM 5250 session keys, and your terminal emulation's equivalent key. See "Keyboard Mapping" in the TN5250 main menu (discussed in Chapter 2) for further details.

Table 3-5   Local Function Keys

TN5250 Key	Terminal Key(s)	Alternate Terminal Key(s)
Exit Session	**Alt X**	none
Exit TN5250	**Alt Z**	none
Command Mode	**Alt ?**	none
Repaint Screen	**Alt <**	none
Session Escape	**Alt >**	none
Session Toggle	**Alt T**	none
TypeAhead Toggle	**Alt :**	none

Text Assist Keys　　　Table 3-6 lists the TN5250 text assist keys and your terminal's equivalent key sequence. See "Keyboard Mapping" in the TN5250 main menu (discussed in Chapter 2) for further details.

Table 3-6　Text Assist Keys

TN5250 Key	Terminal Key(s)	Alternate Terminal Key(s)
Cmd A	Alt a	none
Cmd B	Alt b	none
Cmd C	Alt c	none
Cmd D	Alt d	none
Cmd H	Alt h	none
Cmd J	Alt j	none
Cmd N	Alt n	none
Cmd P	Alt p	none
Cmd S	Alt s	none
Cmd U	Alt u	none
Cmd W	Alt w	none
Cmd Y	Alt y	none
Cmd Field +	Alt e	none
Cmd Field -	Alt f	none
Cmd Field Exit	Alt g	none
Cmd ↓	Alt i	none
Cmd ↑	Alt k	none
Cmd ←	Alt l	none
Cmd →	Alt r	none
Cmd Spacebar	Alt m	none

Table 3-6	Text Assist Keys, Continued	
TN5250 Key	**Terminal Key(s)**	**Alternate Terminal Key(s)**
Cmd Tab	**Alt o**	none
Shift Tab	**Alt q**	none

TypeAhead Buffering

Applications such as data processing and word processing programs normally accept keystrokes as you enter information. However, these applications can lock your keyboard when data is being processed. When a keyboard locks, the II (Input Inhibited) indicator appears on the status line (see Appendix A). Keystrokes that you enter when the keyboard is locked (typing ahead) are not executed as you enter them.

To avoid reentering keystrokes, you can use the emulator's TypeAhead Buffering (a terminal default). TypeAhead Buffering allows you to store additional keystrokes temporarily. When your keyboard unlocks, all stored keystrokes are automatically sent to the host and appear on the screen.

The TypeAhead key sequence is found in Keyboard Mapping/Local Function Keys (Alt :).

If you are operating your terminal in a data processing mode, keyboard buffering is normally inactive. If you are operating your terminal in a word processing mode, keyboard buffering is normally active.

Locked Keyboard

The system request, **Alt Prtsc**, and the error reset **Ctrl** (left), key sequences allow you to interrupt the keyboard's locked state:

◆ **Alt Prtsc**

This is the system request key sequence. When you press this, the keyboard buffer is cleared and the terminal displays the System Request screen. The host will then process keystrokes normally, until you exit this screen by pressing either **Ctrl** (right) key, or the **Alt Prtsc** key sequence. Additional keystrokes are then stored in the keyboard buffer as needed.

◆ **Ctrl** (left)

This is the error reset key. When you press this, the keyboard buffer is cleared and the buffer full mode is reset. Then your session returns, and keystrokes are processed normally. If keyboard buffering is active, keystrokes are stored as needed.

A Error Messages

This section describes the error messages that might display on your terminal screen during a TN5250 session. These error messages are grouped into three categories:

- Telnet errors
- TN5250 internal errors
- Status Line errors

Telnet Errors

Telnet errors are generated by Telnet communications software within a TN5250 terminal. These errors are related to initialization, start up, or connections during a session. They are normally due to operator error, incorrect command syntax, or network failures, and can usually be corrected by the system administrator. Table A-1 lists Telnet error messages.

Table A-1 Telnet Errors

Message	Cause	Resolution
Unable to allocate memory for xxxxxx.key	Unable to allocate memory.	See your system administrator.
Memory allocation failure while installing multiple key	Unable to allocate memory.	See your system administrator.
Memory allocation failure for session	Unable to allocate memory.	See your system administrator.
Memory allocation failure for general work area	Unable to allocate memory.	See your system administrator.
TELNET: tcp/telnet: unknown service	The TCP/Telnet service is not supported for the current host.	See your system administrator.
TELNET: select() failed errno = Error-Number	An internal error within the TN5250 client. Possible TCP/IP network problem.	Try the connection again.

Table A-1   Telnet Errors, Continued

Message	Cause	Resolution
TELNET: socket connection failed	Unable to create a socket for the TCP/IP client. Possible TCP/IP network problem.	See your system administrator.
TELNET: Unable to connect to remote host	Unable to make connection to the specified host. Either the supplied host name and the port number is not correct, or the host is unable to respond.	Verify the host name and port number by executing *telnet* or *ping*.
Host name must be supplied if port number is specified	The host name is missing on the command line.	The host name must be supplied if the port number is specified on the command line.
<Host>: Host name lookup failure	Telnet cannot resolve the host name specified.	Ensure that the host name is spelled correctly.
<Port-Number>: bad port number	The port number specified is invalid.	Ensure that the port number that you have typed is correct
MAIN: error initializing socket library	This is an internal error. Telnet is unable to initialize the socket API routines.	See your system administrator.

TN5250 Internal Errors

Table A-2 lists TN5250 internal errors.

Table A-2   TN5250 Internal Errors

Message	Cause
* * * * * DSPT LOGICAL ERROR <index> * * * * * SYSERR 29: TN5250: DSPT ERROR	This error message indicates that the TN5250 client received invalid data from the server.
SYSERR 16: TN5250: Message buffer is shorter than message	An internal error within the TN5250 terminal.
SYSERR 28: TN5250: LOGICAL ERROR	An internal error within the TN5250 terminal.
SYSERR 0: TN5250: UNKNOWN ERROR	An internal error within the TN5250 terminal.

The Status Line

The Status Line displays real-time system messages that appear during terminal emulation. This field resides at the bottom of your terminal screen, and consists of seven separate sections. Figure A-1 shows the Status Line.

Figure A-1   Status Line

SA   MW   IM   II   TN_5250-n   HOST   HELP: ALT?

Table A-3 describes each section of the Status Line.

Table A-3   Status Line

Section	Description
SA	System Available
MW	Message Waiting
IM	Insert Mode
II	Input Inhibited
TN_5250-n	Telnet 5250 Emulation-Session Number
Host	Host name
Help: Alt ?	Help screen key sequence

Status Line Errors

When an error occurs, error messages are sent from the host. They appear on the Status Line as numbers followed by a message. To respond to Status Line errors:

◆ Press the reset key sequence **Ctrl** (left).

◆ Ensure that the action being undertaken is appropriate.

◆ Ensure that the field into which data is being entered is the appropriate field.

◆ Ensure that the data being entered into the field is valid.

Status errors and their descriptions are listed in Table A-4. Refer to the *IBM 5394 Remote Control Unit Functions Reference Manual* for further information.

Table A-4   Status Line Errors

Error	Description
0000 Help key not allowed	Either no system reference code appears, or the application does not support the key you pressed.
0001 Last keystroke not recognized	The terminal cannot keep up with the rate of information entered. As a result, the last character entered is not recognized.
0002 Last keystroke not recognized	The terminal received an invalid key code from the keyboard. Either the code is incorrect for the keyboard at the terminal, or an error occurred in translating the keystroke.
0003 Invalid CMDx or Fx key	You pressed an invalid **F** or **Alt** key sequence.
0005 Cursor in protected area of display	The cursor is not in an input field, but in a protected area of the display.
0006 Invalid key followed SYS REQ key	You pressed an invalid key after pressing the **Alt Prtsc** key sequence, and before pressing the **Ctrl** (right) or **Ctrl** (left) keys.
0007 Mandatory enter field, must enter data	There is at least one mandatory entry field on the screen that you must enter data into before the screen can be changed or processed.
0008 This field requires alphabetic characters	You tried to enter nonalphabetic characters into a field designated alphabetic. Valid characters here are: ◆ A through Z. ◆ Blank ( ), comma (,), period (.), hyphen (-), and apostrophe ('). ◆ (pad) **1** key. The (pad) **1** key is used to duplicate these characters in the field.

Table A-4   Status Line Errors, Continued

Error	Description
0009 This field requires numeric characters	You attempted to enter non-numeric characters into a field designated numeric. Valid characters for this field are: ◆ Zero (0) through nine (9). ◆ Blank ( ), comma (,), period (.), plus (+), and minus (-). ◆ (pad) **1** key. The (pad) **1** key is used to duplicate these characters in the field.
0010 Only characters 0-9 allowed	The key pressed is not valid for a signed numeric field. Valid entries are: ◆ Zero (0) through nine (9). ◆ (pad) **1** key sequence.
0011 Invalid key for sign position of field	You tried to enter data into the last position of a signed numeric field.
0012 Insert mode, no room to insert data	There is no room to insert data into this field. Either there is no more space in the field, or the cursor is in the last position of the field. Do not use the insert mode to change data, or to enter the last character in this field.
0013 Insert mode-only data keys allowed	You tried to exit a field while the terminal is still in the insert mode.
0014 Mandatory fill field-must fill to exit	You pressed a function key that moves the cursor out of the fill field. A fill field must be completely filled or left blank.
0015 Check digit error	You entered data into a self-check field, and the number entered and the check digit do not compare.
016 FIELD- key invalid with this field	You pressed a field key when the cursor was not in a numeric, digit, or signed numeric field.
0017 Mandatory fill field key is used invalidly	You pressed a fill field key sequence. A mandatory fill field must be completely filled, unless you exit it from the first position of the field.
0018 Invalid key used to exit this field	You pressed a data key when the cursor is in a right adjust field or exit field.

Table A-4   Status Line Errors, Continued

Error	Description
0019 Dup key not allowed in this field	You pressed the (pad) **1** key when it is not allowed in this field.
0020 Function Ctrl key invalid in this field	You pressed a function key that is not allowed in this field. Press an escape key sequence (field keys) to exit this field, before pressing any more function keys or key sequences.
0021 Mandatory enter field, must enter data	The cursor is positioned in a mandatory exit field. You must enter data in a mandatory entry field before exiting that field.
0022 Status of field not known	A system error occurred. The status of the current field is not known. This type of error can occur during an insert or delete operation.
0024 Entry not valid in entry field	You pressed a key that is not valid. Only characters zero (0) through nine (9) and the (pad) **1** key (if specified in the field format word) are allowed in this field.
0026 Character entered invalid for this field	You pressed a field key to exit a numeric-only field, but the last position of the field will not accept a zero (0) through nine (9) character.
0027 Key not defined-key cannot be used	You pressed a key that is either blank or not defined for this terminal.
0029 Invalid international character set	The second key pressed in a two-key sequence did not produce a valid diacritic character.
0099 Key not valid at this time	You pressed an invalid key sequence.

B *Troubleshooting Aids*

Answer the following questions and record the information before you contact technical support. This information can then be used by support engineers, to help you with your problem.

Network Information
- Have software or hardware changes been made to your network?
- Are you using Domain Name Service or a hosts file?
- Can you run a separate executable program, such as *ping* or *telnet*?

Terminal Information
- What is the version number of your operating system?
- Have changes been made to your terminal's configuration?

Problem Description
- What operation were you performing when the problem occurred?
- When did the problem begin to occur?
- Did the terminal emulator operate satisfactorily before the problem appeared?
- Was an error message displayed at your terminal? If so, include the message's text (and case) as it appeared.
- Did other information appear on your terminal's screen when the problem occurred?
- How often does the problem occur?
- Have you attempted to isolate the problem?
- Have you created a temporary solution to the problem? If so, is it documented?
- Have trace files been created that were active when the problem occurred? For example, have you created LAN traces?
- Do you have other information that might assist us in diagnosing your problem? For example, do you have printouts and sample screen prints?

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